REMARKS

Reconsideration of the application is respectfully requested for the following reasons:

1. Rejection of Claims 1-3, 6, 8, and 9 Under 35 USC §102(e) in view of U.S. Patent Publication Nos. 2004/0052306 (Ibrahim) and 2001/0044915 (Vanderstein)

This rejection is respectfully traversed on the grounds that the Ibrahim and Vanderstein publications fail to disclose or suggest, whether considered individually or in any reasonable combination, calculation of a channel response estimate based on delayed actual received data symbols, and *simulated* input data symbols. Instead, the Ibrahim publication discloses calculation of estimated channel response coefficients using accumulators that take a delayed spread spectrum complex baseband sample 116 and an error signal as input parameters, while the Vanderstein publication merely teaches comparing simulated received date with actual data to calculate a bit error rate. It is respectfully submitted that **Vanderstein's** teaching of comparing:

- (a) ***simulated received data*** with (b) ***actual data rate***

is **not** suggestive of substituting the **claimed** two inputs:

- (a) ***delayed actual received data symbols*** and (b) ***simulated input data symbols***

for **Ibrahim's** two inputs:

- (a) ***delayed spread spectrum complex baseband sample*** and (b) ***error signal***.

Vanderstein's teachings have nothing to do with the method of Ibrahim, and *neither* is suggestive of the claimed invention.

Claim 1 specifically recites:

> ***estimating virtual received data symbols*** *($Y_k[n]$) based on said* ***channel response estimate*** *($W_k[n]$) and the simulated input data symbol ($X'_k[n]$); and*
>
> *calculating a different quantity ($e_k[n]$) between the delayed actual received data symbol ($Q_k([n]$) and the estimated virtual received data symbols ($Y_k[n]$) to represent the channel noise of said subchannel k.*

In contrast, the cited passages in the Ibrahim publication describe a channel response determination module 106 for estimating the channel response in which a plurality of

accumulators 162 are operably coupled to produce corresponding coefficients of the estimated channel response 118 based on a corresponding delayed representation of the reconstructed spread spectrum complex baseband samples 116 and an error signal 174. This is contrary to the claimed invention, which takes the channel response estimate as the input to generate virtual received data symbols. There is no suggestion in the Ibrahim publication of **estimating** any sort of **virtual** received data symbols **based on** the channel response **estimate** and the simulated input data symbol as claimed.

As pointed out in the previous response, the claimed invention involves estimating the virtual received data symbols based on an estimate of the channel response, *i.e.*, on an **estimate** based on an **estimate**, while Ibrahim does not even remotely teach such an estimate based on an estimate. In addition, Ibrahim clearly fails to teach calculation of a *different quantity* between the delayed *actual* received data symbol and the *estimated* virtual received data symbols to represent the channel noise of the subchannel. Ibrahim cannot teach such a calculation between actual and estimated virtual received data symbols because Ibrahim does not perform any estimate of virtual received data symbols.

These deficiencies are not made up for by any teachings in Vanderstein, which only generally discloses in paragraph [0005] the concept of simulating received data, with not the remotest suggestion of applying this concept to a system such as the one taught by Ibrahim, much less a teaching of how to do so. Vanderstein teaches simulating received data, but does **not** further teach how the simulated received data is used, and in particular does not disclose or suggest taking the simulated received data as an input parameter for calculation of the channel response estimation. **Instead, Vanderstein merely teaches comparing the simulated received data with the actual data to calculate the bit error rate**. This is completely different than the concept of the claimed invention, and is not obviously applicable to the method of Ibrahim.

The objective of the present invention is to obtain estimated channel noise that requires a large number of data calculations involving many different input parameters in different stages.

In the absence of any clear teachings in Vanderstein of how to do so, the ordinary artisan could not possibly have known what kinds of data calculation and what stages need the simulated received data. Without such teachings, there is no possibility of applying the received data simulation of Vanderstein to the method of Ibrahim, which uses entirely different inputs to obtain an entirely different result.

The differences between the claimed invention and the method of disclosed in the Ibrahim and Vanderstein publications can be seen in the following table:

Claimed	Ibrahim	Vanderstein
Calculate a channel response estimate of one subchannel based on: • *said delayed actual received data symbols; and* • *said simulated input data symbols according to LMS algorithm* Estimate virtual received data symbols based on: • *said channel response estimate; and* • *the simulated input data symbol* and Calculate a difference quantity between: • the actual received data symbols; and • the estimated virtual received data symbols	Use accumulators to produce coefficients of the estimated channel response based on: • *a corresponding delayed representation of the reconstructed spread spectrum complex baseband samples; and* • *an error signal*	Predict error rates based on: • *simulated received data* • *the actual data*

Because the Ibrahim and Vanderstein publications fail to disclose or suggest the combination of method steps recited in claim 1, withdrawal of the rejection of claims 1-3, 6, 8, and 9 under 35 USC §103(a) is respectfully requested.

2. Rejection of Claims 4 and 10 Under 35 USC §103(a) in view of U.S. Patent Publication Nos. 2004/0052306 (Ibrahim) and 2001/0044915 (Vanderstein), and U.S. Patent No. 6,611,513 (Brink)

This rejection is respectfully traversed on the grounds that the Brink patent, like the Ibrahim publication, fails to disclose or suggest a channel noise estimating method that includes the steps of estimating virtual received data symbols based on a channel response estimate, and comparing the estimate virtual received data symbols with actual symbols to represent the channel noise, as recited in claim 1, from which claims 4 and 10 depend.

Instead, the Brink patent merely mentions that "*After the decoding, the estimates on the transmitted information bits are available at the output of the hard decision device by taking the sign of the APP-soft output values for the information bits*" (col. 5, lines 22-28), which is followed by iterative demapping/decoding. There is no suggestion in Brink of estimating virtual received data symbols or of comparing the estimated symbols with actual symbols to represent channel noise, and therefore the Ibrahim and Vanderstein publications and the Brink patent, whether considered individually or in any reasonable combination, could not possibly have suggested the claimed invention, and withdrawal of the rejection of claims 4 and 10 under 35 USC §103(a) is respectfully requested.

3. Rejection of Claims 5 and 11 Under 35 USC §103(a) in view of U.S. Patent Publication Nos. 2004/0052306 (Ibrahim) and 2001/0044915 (Vanderstein), and 2005/0063493 (Foster)

This rejection is respectfully traversed on the grounds that the Foster publication, like the Ibrahim and Vanderstein publications, fails to disclose or suggest a channel noise estimating method that includes the steps of estimating virtual received data symbols based on a channel response estimate, and comparing the estimate virtual received data symbols with actual symbols to represent the channel noise, as recited in claim 1, from which claims 5 and 11 depend. Instead, the Foster publication is directed to preamble detection in digital data receivers, and in particular correction of signal impairment caused by frequency errors in a burst mode receiver, utilizing signal power estimation derived from differential phase components of the received signal. This

has nothing to do with, and therefore is not reasonably pertinent to, the particular problem with which the applicant was concerned, namely dynamically tracking channel noise to obtain channel status in real time. Accordingly, the Foster publication could not have suggested modification of the channel noise estimating method of Ibrahim to obtain the claimed invention, and withdrawal of the rejection of claims 5 and 11 under 35 USC §103(a) is respectfully requested.

4. Rejection of Claim 7 Under 35 USC §103(a) in view of U.S. Patent Publication No. 2004/0052306 (Ibrahim) and 2001/0044915 (Vanderstein), and U.S. Patent No. 5,406,569 (Isozaki)

This rejection is respectfully traversed on the grounds that the Isozaki patent, like the Ibrahim and Vanderstein publications, fails to disclose or suggest a channel noise estimating method that includes the steps of estimating virtual received data symbols based on a channel response estimate, and comparing the estimate virtual received data symbols with actual symbols to represent the channel noise, as recited in claim 1, from which claim 7 depends. Instead, the Isozaki patent is directed to error correction in a digital sync. detection apparatus, and does not disclose any sort of channel response estimate or virtual received data symbol estimation based thereon. Accordingly, withdrawal of the rejection of claim 7 under 35 USC §103(a) is respectfully requested.

Having thus overcome each of the rejections made in the Official Action, withdrawal of the rejections and expedited passage of the application to issue is requested.

Respectfully submitted,
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